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or less rapid compositions and decompositions, that are taking place in this great laboratory of nature.

There was nothing remarkable in the spot which lately appeared, but its magnitude. Its form, appearance and motion, were just as they should be, and just like a thousand others that have appeared before, in strict conformity to analogy, as well as to the constitution of the sun. But because it happened to be larger than usual, every body begins to wonder at it and to guess about it, as a thing that never occurred before. Beside the large spot, which consisted of several distinct nuclei and umbræ, there was a number of small spots to be seen at the same time, by the help of a telescope. These have passed off and new ones have come on. The return of the large spot has not been recognized. The alterations that it underwent, while visible, render it very doubtful whether it retained its identity long enough to reappear.

FOR THE NORTH-AMERICAN JOURNAL.

Lee's Observations on Light.

A paper was read before the Royal Society of London in June, 1815, on the dispersive power of the atmosphere and its effects on astronomical observations. It was presented by Stephen Lee, Clerk and Librarian to the Royal Society. It contains some very interesting remarks and observations upon a phenomenon, which has been almost entirely overlooked, and which appears to have an important influence upon the apparent places of the heavenly bodies. Every one knows, that when a beam of light passes obliquely from one medium to another, the different rays are refracted unequally, some are deflected more, and others less, from a rectilineal direction. The several rays, constituting the different colours, are thus separated from each other, the red being least refracted, and the violet most. But no allowance has been made for this difference of refrangibility, notwithstanding the difference of colour among the heavenly bodies, and the differently coloured glasses that are used in looking at the sun and moon. When the sun's altitude for instance, is taken with a sextant, a glass, that is tinged with some colour, is used to protect the eye. But different

colours will give different altitudes. The sun's image is not perfectly round, when his rays fall obliquely upon the atmosphere. It consists of several circles, rising one a little above the other, the violet being highest, and the red lowest, and coinciding throughout, except a small fine crescent above and below. The correction for refraction then, ought to be, according to the image that is selected, and in reducing observations of the stars and planets, regard should be had to the particular colour under which they appear.

"The different refrangibility of the differently coloured rays," says Mr. Lee, "is very visible in stars near the horizon. If viewed on a fine night with a power of 200, they appear expanded into a prismatic spectrum, Sirius, when within a few degrees of the horizon, presents a most beautiful object.

"Having remarked the very oblong figure which the spectrum assumes when near the horizon, and found from repeated observations of different stars, that the separation of light begins to be visible as high as forty or fifty degrees of altitude, I was led to believe, that the dispersive power of the atmosphere must be sufficient in many cases to produce considerable effect on astronomical observations; and consequently to suppose, that it would be desirable to ascertain if possible the exact degree of separation of the several rays."

After describing the manner in which he conducted his observations, and the kind of apparatus which he used for determining the amount of the dispersion, he says, "From a great number of observations on Mars, Venus and the fixed stars, taken in all these different ways, I found the deviation of the extreme rays of light to be between the 1-60 and 1-70 part of the total refraction."

Mr. Lee supposes, that the disagreement, which is found to exist between the latitude of a place deduced from observations of circumpolar stars, and that, from observations of the sun, may be traced to the use of dark glasses; and that other differences have arisen from the introduction of coloured glasses, which give a deep red image, in the place of smoked glasses, which he supposes, were first used in observatories, and which give a pale orange coloured image.

"The introduction of achromatick object glasses," he continues, "produced an error of a different kind, and one

which in certain cases, tends to correct the other. In the single object glass telescope, the differently coloured images are formed at different focal distances, which in a manner compels the observer to adjust his instrument to the most intense light, that is to say, to the orange coloured image; by this means, the fainter colours, which occupy the greatest space of the spectrum, are dissipated and lost among the more powerful rays. In good achromatick telescopes the case is very different, for all the rays being collected by them into one point, every colour is seen in its proper place, so that the observer, in bisecting the spectrum, takes the altitude of the mean, or the upper extremity of the green image." We will add two more paragraphs.

"It may not be amiss," says the writer, "to observe here, that the observations of Mr. Lalande at Paris show a greater disagreement, than those at Greenwich, and the observations of Mr. Piazzi at Palermo, a still greater than those of Mr. Lalande. This, I apprehend, must arise partly from the lesser elevation of the pole in those places, and partly from the fainter colours in the stellar spectra, being more distinctly visible in the clear atmospheres of France and Italy, than in England."

"It should seem then, that in order to get a perfect knowledge of astronomical refraction, we ought to employ at least three different methods of investigation. First, by observations of the fixed stars during the night, when all the prismatic colours are visible. Secondly, by observations of stars during the day, when none, but the orange coloured rays, are to be seen. And thirdly, by observations of the sun with differently coloured glasses. By these means we might hope to obtain such an accurate knowledge of atmospherick refraction, as would enable us to form tables adapted to every possible circumstance."

FOR THE NORTH-AMERICAN JOURNAL.

Sandwich Islands.

American vessels, in their voyages to and from the North-West coast of this continent, frequently stop at the Sandwich Islands, for refreshments and repairs, and the restoration of health to their crews, generally impaired by